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ABSTRACT

This booklet discusses techniques and activities intended to help early childhood educators to explain the structure and function of the human body to preschool children. It reviews typical questions that preschoolers have about what goes on inside their bodies, observations that children make about the human body, how children draw the human body, and their understanding of the location and function of the internal organs. Questions, reactions, and observations by preschoolers are provided. The booklet also discusses what children typically want to learn about their bodies, as well as specific activities and instructional materials that can be used with preschoolers. It concludes by noting that the expansion of children's knowledge about the human body will give them a more sophisticated working knowledge of their own internal bodies, and hence a greater sense of control. (Contains 11 references.) (MDM)

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What Do I Look Like on the Inside?

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Developing children's understanding about their bodies

Marilyn Fleer & Careen Leslie

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What Do I Look Like on the Inside?

Developing children's understanding about their bodies

Marilyn Fleer & Careen Leslie

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Introduction

When you talk to young children about what they think is inside their bodies, a range of interesting ideas is heard. For example:

Teacher: What's this, Jenny? *(Points to the middle of Jenny's drawing of her body outline.)*

Jenny: Food.

Teacher: Food. Can you tell me what's inside your body?

Jenny: *(Shakes head.)*

Teacher: It's the food going down...where?

Jenny: My leg. *(Points to her leg on the body outline.)*

Teacher: Oh! It's gone right down into...Is there anything else here...what's down here? *(Points to Jenny's outline of her foot.)*

Jenny: Soft blood.

Teacher: Soft blood. There is soft blood down here. *(Points to outline of foot.)*

Jenny's perception of what is inside her body

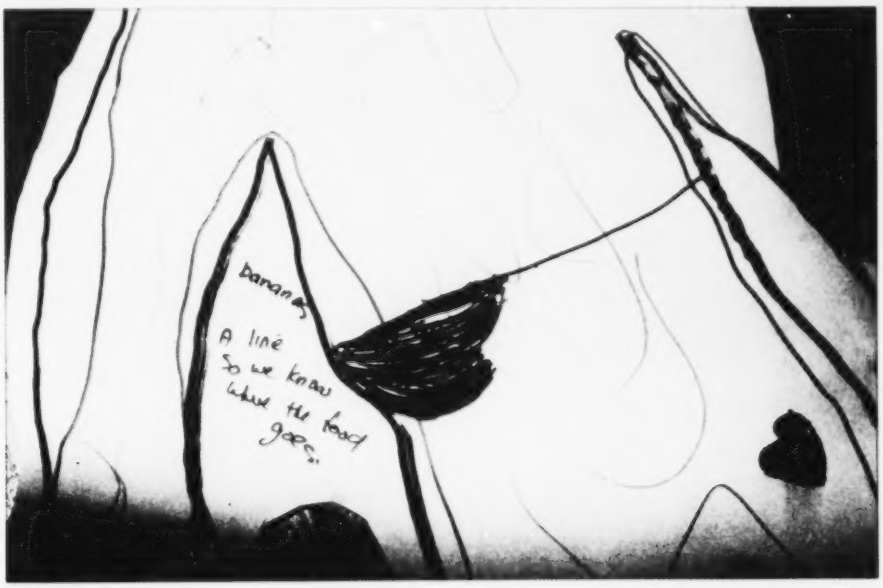
Jenny's ideas about the inside of her body reveal some unusual thinking. Firstly, she thinks that, when the food leaves her mouth, it travels down into her legs; and secondly, she believes that she has soft blood in her feet. During her four years of life she has theorised about what the inside of her body looks like. These views need to be respected—despite the obvious inaccuracies.

The circulatory system and the digestive system are commonly misunderstood by young children. They represent two areas in which children have a strong level of interest but not a great deal of experience. For example, children have many experiences with cuts and bruises and will demonstrate as much interest in the blood as the Band-aid.

Similarly, children eat many meals each day and are often involved in discussions surrounding how important it is to eat and the nutritional content of the food they are considering. However, their working knowledge of their body is not sophisticated. In fact, research has shown it to be so limited that they are unable to really understand many nutritional and safety discussions directed towards them by adults (Coulson & Smith, 1994).

Interestingly, most early childhood programs have tended to focus on the external body only. The interconnectedness between the external and internal body need also to be considered in a program which focuses on the whole child.

In this book, we explore these concepts through outlining some of the ideas that children between the ages of three to eight hold about their bodies, and some learning experiences which will expand children's thinking about organs and their function in the body.



Phillip's perception of what is inside his body

Hollow Legs

From the earlier transcript, you could probably imagine a parent saying, 'Jenny eats so much I am sure she has hollow legs'. Many of the ideas children have about their bodies can be traced back to either a confusion regarding everyday expressions, such as 'hollow legs', or simply limited life experiences by the child.

Children will hear references to different parts of their bodies, such as 'Use your brains, Amanda!', 'Rowan has a warm heart', or, when holding their hands over their intestines and not their stomach, 'Do you have a stomach ache?' As a result, children begin to piece these bits of information together and build a picture of the inside of their bodies—often with amazing concepts. The ideas children hold become apparent when instances such as the following occur:

A teacher was introducing a group of children to whole group time...

Teacher: When we all sit together like this it is called group time. It is a time when you must look with your eyes (*pointing to eyes*), listen with your ears (*pointing to ears*) and think with your brain (*pointing to top of head*)...

Ross: (*Interrupting*)...My mum says I haven't got any brains!

Making Sense of 'Adult Talk'

As a result of children's experiences with everyday language in the home and school, a range of views is held. Research has shown that, when given the opportunity to draw or talk about their bodies, young children will identify non-organs as well as organs (Denehy, 1984; Coulson & Smith, 1994; Fleer, 1994). The commonly named items are the brains, bones, heart, and blood. However, items of food are commonly drawn floating around the body. This type of response is clearly illustrated in the drawing on the previous page where Phillip has drawn a line across the centre of his body to indicate where the food stops. Older children will expand this list to include lungs, muscles, kidneys, and intestines (Gellert, 1962; Porter, 1974).

Young children will identify non-organs as well as organs

An interesting feature of young children's work in this area is the inclusion of facial features, hair, and a navel. These items seem to be important to very young children. The research literature tends to suggest that these items are omitted (and only internal organs drawn) as the child increases with age (Amann-Gainotti & Antenore, 1990).

Another interesting aspect of children's drawings of the internal body is the stylised nature of the heart; children under and over the age of seven draw the heart in a stylised fashion. Jenny's drawings opposite demonstrate another element strongly supported by the literature, and that is of the discrete placement of organs in the body. It is not until children are much older (over ten years) that they begin to draw connections between organs.

Children's understanding of the internal body can be summarised into a five-step developmental scale.

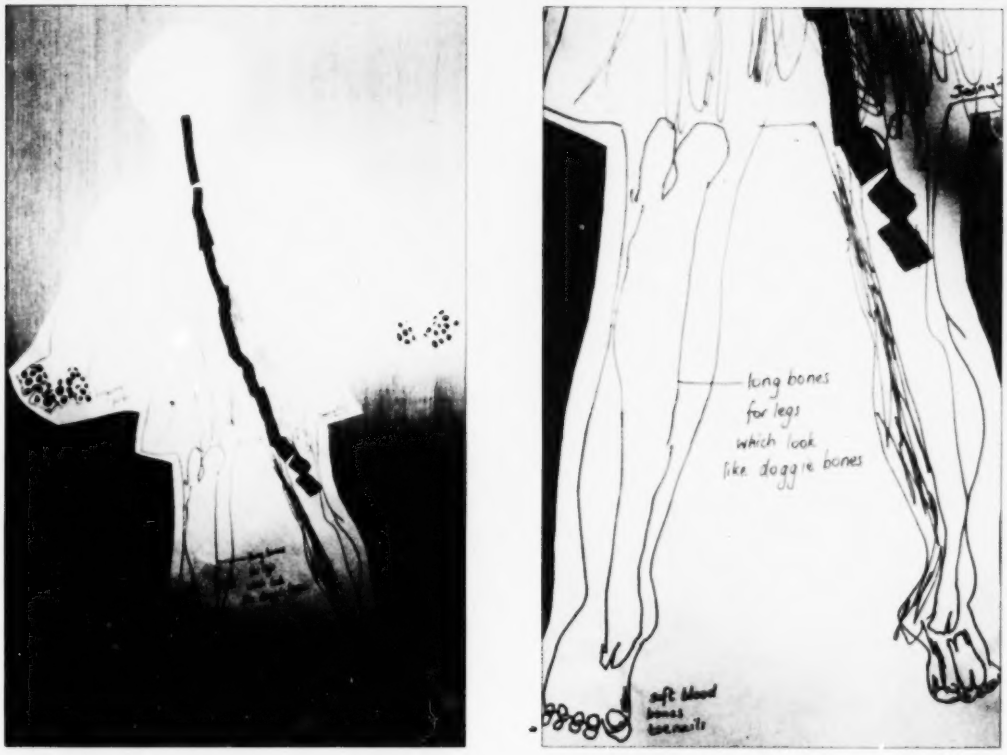
1. The internal organs are likely to be drawn inside and outside of children's bodies.
2. A mixture of external items—such as facial features, decorative elements (bows and ribbons), and the navel—is likely to be included in the drawings of the internal body.
3. The number of internal body parts drawn increases with age.
4. The anatomical location of organs becomes more accurate with age.
5. The connections between organs—at first partial and limited—become progressively more complete.

There is strong evidence to support these findings within the research literature (Amann-Gainotti & Antenore, 1990; Coulson & Smith, 1994; Denehy, 1984). However, there is limited research available to guide staff in planning for individual children's learnings of their whole body (Vessey, 1988; Fleer, 1994). In the following section, some ideas are presented on how to develop young children's understanding of their body.

Making Observations

Observations of children in everyday contexts within a home, centre or school provide some information on what children think about their internal body. This information is useful as a starting point for working with individuals and with individuals within a group. However, sometimes it is necessary to provide children with a context which will facilitate their thinking and encourage them to express their understanding.

A common preschool experience of tracing around children's bodies provides just this observational context. Children can be asked to draw what they think is inside themselves, rather than to decorate their outline as is the usual practice. Given the variability of children's



Jenny's finished drawing of the inside of her body

ability, they need to be given a range of materials for this task (pens, paper, glue and collage materials). Each child should be encouraged to comment on what they have drawn. It may be possible to record such comments in order to provide information for later program planning for individuals. This process can provide staff with a sound working knowledge of what children understand, and, most importantly, it facilitates good program planning.

Some examples of children's work can be seen in this book. Below is an example of the observational information recorded for four children at the Wiradjuri Preschool Child Care Centre, University of Canberra.

Tegan (3 years 10 months)

1. Includes facial features.
2. Uses crosses to represent bones.
3. Two sacks marked in chest—one for air, the other for food.
4. Veins (on wrist, blue).

Jasmin (4 years 2 months)

1. Includes brain—'brain is at the top'.

2. Body is divided into two sections by a line drawn horizontally just above navel—'line so we know where the food goes'.
   Banana and broccoli marked above line.

Catherine (5 years 2 months)

1. Includes facial features.

2. Stylised bones for legs and arms, i.e. 'big long bone that goes from my toe to the top of my leg'; one bone (width of trunk) down centre of body; and head is 'a bone around my head'.

3. Blood—'the veins pull the blood everywhere'; 'a cut, another cut, a red toe'.

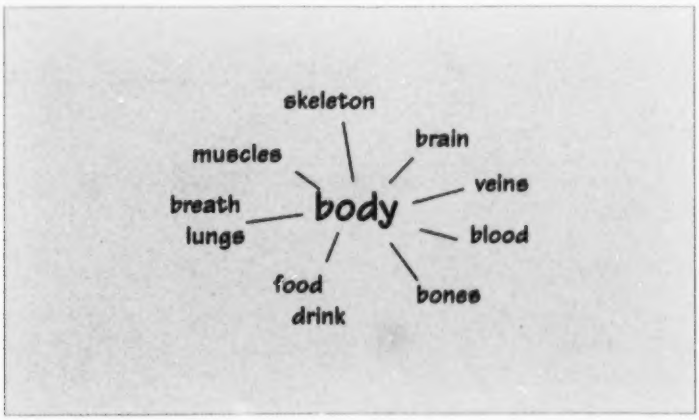
Edward (3 years 7 months)

1. Facial features and shoulder pads included.

2. 'My food goes down here to my feet'—line from mouth to feet. 'My food can go down my other leg as well'; 'some food goes to the front of my foot and some goes to my back'.

3. Heart—'the heart makes my bones and my blood come up'.

4. Bones—'it stops there and then goes again', 'foot bone'.



Sand drawings may work well with children during outdoor time.

Planning for Individuals and for the Whole Group

In order to move children's thinking forward so that they have a more systematic view of the internal body and are better able to understand the comments made by adults regarding their bodies, it is important to plan for a range of experiences over time rather than one-off activities. Children usually enjoy drawing around each other's bodies, but for those who may not be interested in this activity, provide large sheets of paper on an easel, small sheets of paper at the drawing table, and chalkboards or white boards (depending upon facilities) so that they too have an opportunity to express their understanding. Similarly, sand drawings may work well with other children during outdoor time (a notebook to record children's ideas may be needed).

Tracing around children's bodies provides a means for them to express their understanding.

What Do Children Want to Learn About Their Bodies?

In the process of working together with children to record their ideas in a range of mediums, it is likely that children will begin to ask questions about themselves. This presents an opportunity in which it is possible to plan learning around children's questions. Likely questions are:

1. How does the food go down?
2. Why do we need blood?
3. How does the skeleton go together?
4. How do we breathe?

These questions indicate that young children do not have a concept of their bodies as a system—a concept which is essential to understanding total care of the body.

Children's Investigations

Given the opportunity, young children may be able to suggest a range of different ways for finding out the answers to their questions. For example, the group of preschool children who asked the questions listed above suggested the following investigations:

- 'Cut a dead body open',
- 'Go to the hospital', and
- 'Look in some books'.

Since it is not possible to follow the first suggestion, the teacher of these children suggested using models instead. This was greeted with great enthusiasm by the children.

Looking under the skin!

One way to help children answer the questions they have about their bodies is to simulate peeling off their skin so as to look under it! This can be easily done by using one of the children's cut-out body outlines. Simply have another cut-out beneath it with drawn or cut out pictures of the various organs. If cut-outs are used, they can be held in place with Blutack and removed for discussion. However, there is a range of commercial materials available which will also allow for this type of exploration. 'Mr Peel' (shown below) is one example.

This idea can also be introduced through felt boards. If energy or resources permit, have a range of different materials available for children to play with during the day. The more opportunities children have to freely manipulate these materials, the more likely they are able to conceptualise their internal bodies.

'Mr Peel' shows the body system in layers.

A body apron

A painting smock with drawn or felt cut-outs of body organs attached by Blutack or Velcro is a useful resource. Balls of plaited wool for intestines may also be a nice extra. Children can take off and put back all the major body organs (particularly if a hospital corner is created). There is a commercial product available which is a useful alternative.

The Body Apron *in action.*

Models

There are also many resource centres, libraries and schools which house a range of 3-D body models. However, these can also be easily made with, for example, box construction materials.

Using books

Since looking in books is likely to be suggested by children, this presents an opportunity in which to introduce relevant visually interesting and informative non-fictional books such as *What's Inside? My Body* (Royston, 1992).

Skeletons

Skeletons are of great interest to children who are often curious as to how bones fit together. In order to satisfy their curiosity it may be possible to introduce a full-sized skeleton. However, there are many inexpensive small rubber skeleton toys available that can be used instead. Alternatively, a polystyrene ball can be used for a skull and connected to cardboard 'bones'. Popsticks or matchsticks with Blutack also provide excellent resources for children, as they can make their own.

The range of resources outlined above provides children with many opportunities in which they can explore and investigate the inside of their body system.

Listening to the body

A useful way for children to gain a more intimate understanding of the inside of the body is for them to use a cardboard cylinder (for example the roll inside plastic wrap) to listen to each other's bodies. A good time is before meals, when the stomach makes a range of interesting

sounds. Ask children to try and work out where they think their stomach (and their partner's) is, place the cylinder on different parts of the body, and listen for the sounds. Similarly, ask the children to listen to each other's hearts. Try this before and after running on the spot.

Suggestion: Sing 'The Heart is Like a Pump' to the tune of 'The Farmer in the Dell'.

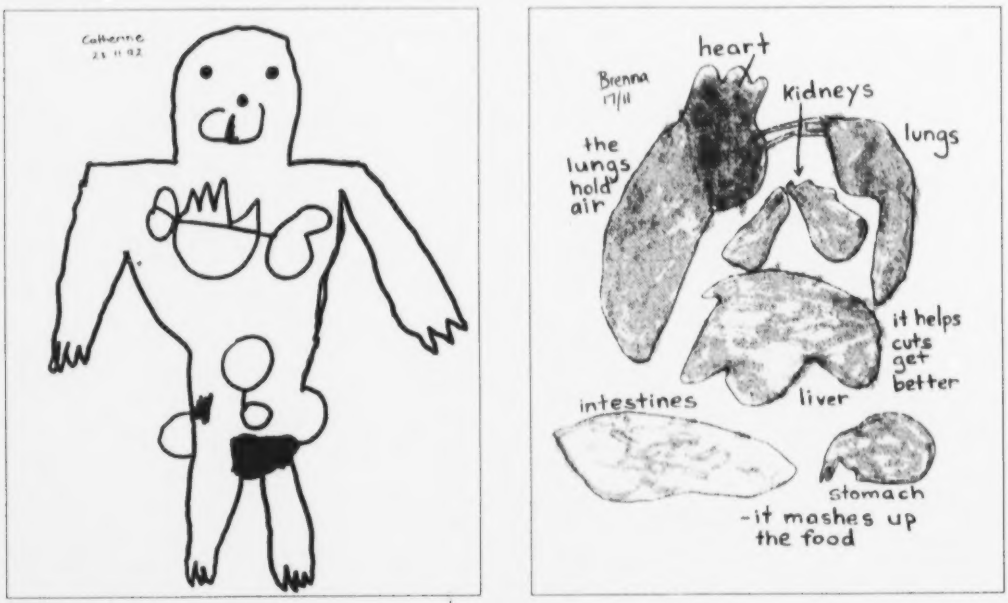
Balloon lungs

Balloons also make useful teaching resources. If children demonstrate an interest in knowing how their lungs work, then use balloons as a way of simulating the lungs breathing air.

A system view of the digestive tract

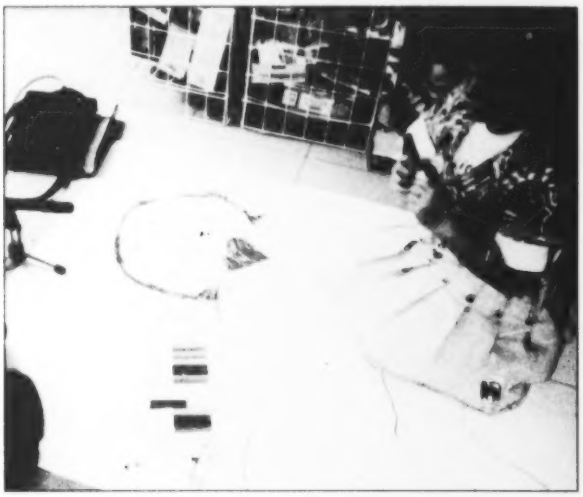
It is likely that children will ask questions about their stomachs. In order to simulate the system view of the digestive tract to children, try the following inexpensive but interesting activity. The experiences should provide plenty of stimulus for discussion and help children to develop a greater understanding of how the organs all work together.

1. Have a child hold a plastic bag in the position of the stomach. Place a piece of banana, biscuit, and some water inside the bag. The child can pretend to eat the banana and biscuit as the food items are cut and placed into the bag. The child should then squeeze the plastic bag to show the breaking down action of the stomach. Ask the children to comment on whether the contents in the plastic bag look anything like banana and biscuits.



Catherine and Brenna's drawings of the organs inside their bodies.

2. The contents of the 'stomach' can then be spooned into a stocking leg and pushed through it to simulate the intestinal action inside the body. It may be useful to talk about the length of the intestines (as long as a tall tree!).



Draw around each of the children and ask them what is inside their bodies.

Observational Records

In order to see how much children have really understood, it may be useful to repeat the first experience—drawing around each of the children (or asking them to draw a picture of their insides) and asking them what is inside their bodies. A comparison of what children first think and what they understand at the end of a program can be done in this way.

Final observational records of the same four children observed earlier are shown below. Clearly, the children have gained a great deal of understanding about themselves.

Tegan (3 years 10 months)

1. Includes facial features.
2. Crosses down arms only.
3. Two lungs included; separate stomach.
4. Veins (on wrist, blue).
5. Stylised heart.

6. Intestines (small and colon).
7. Blood shows as red lines around the body.
8. Liver.

Jasmin (4 years 5 months)

1. Includes hair—'I can't draw my brain 'cause my hair's there'.
2. Liver—'the liver makes you stop bleeding'.
3. Stomach—'this is where the food goes when it gets all mushed up in the intestines'.
4. Skeleton marked in places—'the skeleton helps your body stand up'.

Catherine (5 years 2 months)

1. Includes facial features.
2. Bones not included.
3. 'The blood is going all around the body'.
4. 'The heart pumps the blood'.
5. 'The liver pumps up all your blood'.
6. 'The stomach mixes up all the food and takes it down to the intestines'.

Edward (3 years 6 months)

1. Facial features, finger-nails, and shoulder pads included.
2. Stylised heart—'your heart makes you breathe and makes new bones'.
3. Lungs—'your lungs help your heart work'.
4. Kidney—on back, blood coming out of kidney.
5. Two leg bones (drawn from shoulders down body to each leg).

Conclusion

Any program that is developed for increasing children's understanding about their bodies will be dependent upon the group of children and the needs of the individuals in the centre or classroom. Although each group is likely to have different experiences and hence ideas about the internal body, some of the views outlined in this book have been shown by research to be commonly expressed by young children.

Expanding children's understanding of the *whole* body will give them a more sophisticated working knowledge of their own internal body, and hence a greater sense of control.

Many resource centres, libraries and schools house a range of 3-D body models.

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Further reading

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Endnotes

Mr Peel can be ordered from the Mentone Educational Centre, Victoria, or is available through the Curriculum Resource Centre, University of Canberra.

The Body Apron is available from Modern Teaching Aids Pty Ltd, New South Wales.

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